

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-28 (Cancelled)

29. (New) A method for modifying a polymeric material, comprising:

- introducing the polymeric material into an extruder comprising a feed zone, a compression zone and a discharge zone, and equipped with at least one introduction device comprising a first pump, a second pump, a mixing chamber, a pressure sensor, and an injector,

- introducing into each introduction device:

- at least one chemical compound in the fluidized state via the first pump into the mixing chamber,
 - precooled carbon dioxide via the second pump into the mixing chamber,

whereby the chemical compound(s) and the carbon dioxide are mixed in the mixing chamber to provide a mixture,

- introducing the mixture(s) into the interior of the extruder, into a zone of the extruder where the polymeric material is in the fluidized state, via the injector, and

- extruding the polymeric material together with the mixture(s) under conditions permitting reaction between at least one of the chemical compounds and the polymeric material.

30. (New) The method according to Claim 29, wherein the pressure at the injector, measured by the pressure sensor, is above 74 bar and the temperature is above 31.4°C, and the carbon dioxide is in the supercritical state.

31. (New) The method according to Claim 29, wherein the zone of the extruder into which the mixture(s) is/are introduced is a zone where the polymeric material is in the viscous liquid state.

32. (New) The method according to Claim 29, wherein the polymeric material is a vinyl polymer.

33. (New) The method according to Claim 32, wherein the vinyl polymer is a homopolymer of an olefin, a copolymer of an olefin, a halogenated vinyl homopolymer or a halogenated vinyl copolymer.

34. (New) The method according to Claim 32, wherein the vinyl polymer is a homopolymer of vinylidene fluoride or a copolymer of vinylidene fluoride.

35. (New) The method according to Claim 29, wherein the polymeric material is a thermoplastic aliphatic polyester.

36. (New) The method according to Claim 35, wherein the thermoplastic aliphatic polyester is a polymer of ϵ -caprolactone.

37. (New) The method according to Claim 29, wherein the chemical compound(s) is/are liquid at room temperature.

38. (New) The method according to Claim 29, wherein the chemical compound(s) is/are solid at room temperature and the introduction device is adapted in such a way that the chemical compound(s) is/are in the fluidized state.

39. (New) The method according to Claim 29, wherein the pressure in the interior of the injector is at least 90 bar.

40. (New) The method according to Claim 29, wherein the extruder comprises a barrel, and the injector is arranged perpendicularly to the barrel.

41. (New) The method according to Claim 29, wherein the extruder comprises an extrusion screw, and the injector emerges tangentially to the extrusion screw flights.

42. (New) The method according to Claim 29, wherein the mixing chamber is equipped with an agitation system.

43. (New) A method for synthesizing a polymeric material, comprising:

- introducing a material to be polymerized into an extruder comprising a feed zone, a compression zone and a discharge zone, and equipped with at least one introduction device comprising a first pump, a second pump, a mixing chamber, a pressure sensor, and an injector,

- introducing into each introduction device:

- at least one chemical compound in the fluidized state via the first pump into the mixing chamber,

- precooled carbon dioxide via the second pump into the mixing chamber,

whereby the chemical compound(s) and the carbon dioxide are mixed in the mixing chamber to provide a mixture,

- introducing the mixture(s) into the interior of the extruder, into a zone of the extruder where the material to be polymerized is in the fluidized state, via the injector, and

- polymerizing the material to be polymerized together with the mixture(s) in conditions permitting reaction between at least one of the chemical compounds and the material to be polymerized, and

- extruding the resultant polymeric material.

44. (New) The method according to Claim 43, wherein the pressure at the injector, measured by the pressure sensor, is above 74 bar and the temperature is above 31.4°C, and the carbon dioxide is in the supercritical state.

45. (New) The method according to Claim 43, wherein the zone of the extruder into which the mixture(s) is/are introduced is a zone where the material to be polymerized is in the liquid state.

46. (New) The method according to Claim 43, wherein the polymeric material is a thermoplastic aliphatic polyester.

47. (New) The method according to Claim 46, wherein thermoplastic aliphatic polyester is a polymer of ϵ -caprolactone.

48. (New) The method according to Claim 43, wherein the chemical compound(s) is/are liquid at room temperature.

49. (New) The method according to Claim 43, wherein the chemical compound(s) is/are solid at room temperature and the introduction device is adapted in such a way that the chemical compound(s) is/are in the fluidized state.

50. (New) The method according to Claim 43, wherein the pressure in the interior of the injector is at least 90 bar.

51. (New) The method according to Claim 43, wherein the extruder comprises a barrel, and in that the injector is arranged perpendicularly to the barrel.

52. (New) The method according to Claim 43, wherein the extruder comprises an extrusion screw, and the injector emerges tangentially to the extrusion screw flights.

53. (New) The method according to Claim 43, wherein the mixing chamber is equipped with an agitation system.